NASA Jet Propulsion Laboratory (JPL) Remedial Project Manager (RPM) Meeting
April 30, 2013 Meeting Summary

Location: JPL Building 180 (9th Floor Conference Room), Pasadena, California
Date/Time: April 30, 2013 / 9:00 AM Pacific

Attendees (Sign-In Sheet Provided as Attachment No. 1):

Name	Affiliation	Title
Colleen Oinuma	Congressman Adam Schiff	Field Representative
Bryan Urias	Congresswoman Judy Chu	Field Representative
Steven Slaten	NASA	NASA JPL Program Manager
Merrilee Fellows	NASA	Manager for Community Involvement
Judy Huang	EPA Region 9	Remediation Project Manager
William Jeffers	California DTSC	Remediation Project Manager
Alice Campbell	California DTSC	Senior Geologist
Kwang Lee	California RWQCB	Sr. Water Resources Control Engineer
Chay Tang	California RWQCB	Remediation Project Manager
Karen Wong	California DPH	Associate Sanitary Engineer
Kelly Gardner	Raymond Basin Management Board	Administration Manager
Nina Jazmadarian	Foothill Municipal Water District	General Manager
Robert Hayward	Lincoln Avenue Water Company	General Manager
Shan Kwan	Pasadena Water and Power (PWP)	Assistant General Manager
David Kimbrough	PWP	Water Quality Manager
Brad Boman	PWP	Engineering Manager
Gary Takara	PWP	Principal Engineer
Roumiana Voutchkova	PWP	Engineer
Aileen Hermoso	PWP	Principal Analyst
Bill Mabey	TechLaw (EPA Contractor)	Consultant
Steve Johnson	Stetson (RBMB Contractor)	Consultant
Mark Williams	WMI (PWP Contractor)	Consultant
Dennis Williams	Geoscience (PWP Contractor)	Consultant
Neil Sturchio*	UIC (NASA Contractor)	Professor of Geochemistry
David Conner	Battelle (NASA Contractor)	Consultant
Ben Headington	Battelle (NASA Contractor)	Consultant
Keith Fields	Tidewater (NASA Contractor)	Consultant

* Participated via teleconference

Summary:

- Following introductions, Steve Slaten the NASA JPL Program Manager presented an update on the JPL CERCLA Program. The presentation slides are provided as Attachment No. 2.
- Mr. Slaten's presentation included the following:
  - A brief history of the JPL facility and CERCLA program.
  - The status of ongoing treatment efforts for the source area treatment system, the Monk Hill Treatment System (MHTS), and the Lincoln Avenue Water Company (LAWC) Treatment System.
  - NASA's plans and rationale for expediting cleanup and improving remediation effectiveness for offsite groundwater treatment (referred to as Optimization plans),

including installing a new well for the City of Pasadena for the MHTS, installing a new well for LAWC, and improvements to wastewater management at MHTS associated with groundwater cleanup efforts.
    - A summary of NASA's Additional Investigation efforts associated with determining the extent of contamination associated with the JPL CERCLA site, in particular, the occurrence of perchlorate in the Sunset Reservoir Wells (2004 to present). Based on an integrated evaluation of all available data/evidence including consideration of comments received, NASA continues to conclude that (1) the chemicals from the JPL facility are captured within the Monk Hill Subarea, and (2) the perchlorate detected at the Sunset Reservoir Wells is of a different origin than that used at, and originating from, JPL.
    - NASA's recommended path forward for the groundwater remediation at the JPL CERCLA Site, which includes moving forward with the optimization efforts and moving toward a final groundwater Record of Decision (ROD) for JPL. The first step in moving toward the ROD is a Focused Feasibility Study (FS) that will be submitted for regulator and stakeholder review this summer.
- Judy Huang stated EPA's position regarding perchlorate in the Sunset Reservoir Wells. Specifically:
    - EPA has thoroughly reviewed the May and August 2012 Technical Memoranda prepared by PWP and the Technical Responses to the PWP memoranda prepared by NASA.
    - The studies by NASA and PWP are inconclusive.
    - The studies by NASA and PWP do not indicate that the Sunset Reservoir Wells should be part of the JPL CERCLA Site at this time. Even if NASA were a contributor to perchlorate as the Sunset Reservoir Wells, the contribution would be minimal.
    - EPA recommends that NASA moves forward with the optimization plans and the final groundwater remedy.
    - As part of the final groundwater remedy, EPA recommends that NASA continue monitoring wells between JPL and the Sunset Reservoir Wells (e.g., MW-26 and MW-25). If future data demonstrate NASA is a source of perchlorate in the Sunset Reservoir Wells, NASA would be required to address the contamination.
    - Data will be evaluated, at a minimum, as part of the CERCLA Five-Year Reviews for JPL. The JPL regulators and local water purveyors would be part of the review process for the Five-Year Reviews.
- David Kimbrough provided a presentation on PWP's studies regarding the perchlorate in Sunset Reservoir Wells. The presentation slides are provided as Attachment No. 3.
    - PWP has concluded that there was not containment of perchlorate originating from JPL within the Monk Hill Subarea and that NASA is the source of perchlorate in the Sunset Reservoir Wells.
    - Some discussion occurred regarding the interpretation of data by NASA and PWP, options for funding removal of perchlorate from the Sunset Reservoir Wells outside of the JPL CERCLA Program (e.g., EPA grant programs), and potential impacts of a revised perchlorate MCL.
    - Steve Johnson mentioned RBMB's concern that if perchlorate continues to migrate downgradient from the Sunset Reservoir Area, additional drinking water production wells could be impacted.
- The meeting was concluded and a site tour was offered to interested attendees.

- Shan Kwan and David Kimbrough accompanied Steve Slaten on a tour of the source area treatment plant.
- Note: All slides, including backup slides prepared by PWP but not used during the meeting, will be posted on the JPL CERCLA Program Website (http://jplwater.nasa.gov/).

Attachment No. 1

Sign-In Sheet

April 30, 2013 RPM Meeting

Name	Organization	E-mail & Phone
Keith Fields	NASA Consultant/ Tidewater	keith.fields@tideh2o.net 614.792.2896
Colleen Oinuma	Congressman Adam Schiff	Colleen.OINUMA@mail.house.gov 818-450-2900
David Kimbrough	PWP	dkimbrough@cityofpasadena.net 626-744-7315
Brad Boman	PWP	bboman@cityofpasadena 626 744-4278
Robert Hayward	LACWC - RBMB	bhayward@LACWC.org (626) 798.9101
Bryan Urias	Rep. Judy Chu	Bryan.Urias@mail.House.gov
BILL MABEY	CONSULT TO EPA	bmabey@techlawinc.com
Judy Huang	US EPA	huang.judy@epa.gov (415) 972-3681
Chay Tang	LARWQCB	chay.tang@waterboards.ca.gov 213/576-6705
Kwang Lee	LA RWQCB	Klee@waterboards.ca.gov 213-576-6734
Shan Kwan	Pasadena	skwan@cityofpasadena.net (626) 744-4416
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Aileen Hermoso	PWP	ahermoso@cityofpasadena.net (626) 744-4016
Steve Johnson	Stetson/RBMB	626 967-6202 steve@stetsonengineers.com
KELLY GARDNER	RBMB	kelly@watermaster.org
MARK WILLIAMS	WMI /PWP	MWILLIAMS@WMIENG.COM
Dennis Williams	GEOSCIENCE / PWP	dwilliams@geoscience-water.com
Karen Wong	Calif. Dept of Public Health	karen.wong@cdph.ca.gov 818-551-2037
Ben Headington	NASA Consultant / Battelle	headingtonb@battelle.org 614-424-5489

NAME	ORG	Contact
William Jeffers, PE,	California DTSC	william.Jeffers@DTSC.CA.GOV 818-717-6586
Alice Campbell PG, CHg	Calif DTSC	alice.campbell@DTSC.CA.GOV 818 717 6623
Nina Jazmadarian	Foothill MWD	njazmadarian@fmwd.com 818 790-4036
David Conner	Battelle	connerd@battelle.org 619-726-7311
Steve Slaten	NASA	sslaten@nasa.gov 818 393 6683
Merrilee Fellows	NASA	

Attachment No. 2

Steve Slaten's Presentation Slides

NASA Jet Propulsion Laboratory CERCLA Program

April 30, 2013 RPM Meeting

Meeting Agenda

(1) Introductions

(2) Background

(3) Status of Treatment

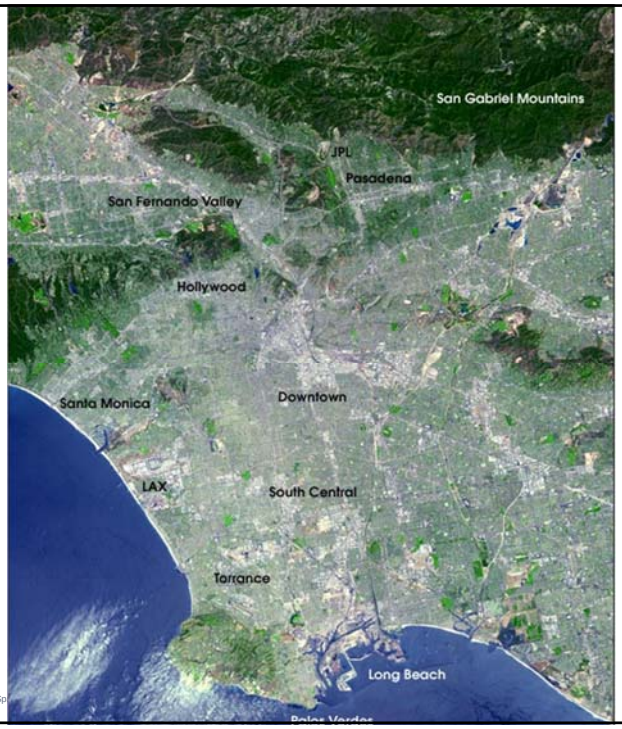
(4) Optimization Concepts

(5) Sunset Reservoir Wells

(6) Site Tour

Introductions

- Opportunity for the team to meet our two new State RPMs
  - » William Jeffers (Department of Toxic Substances Control)
  - » Chay Tang (Regional Water Quality Control Board)
- Other agencies represented:
  - » Congress member Chu's Field Rep, Bryan Urias
  - » Congress member Schiff's Field Rep, Colleen Oinuma
  - » EPA Region 9
  - » California Department of Public Health
  - » City of Pasadena, Pasadena Water and Power and consultants
  - » Lincoln Avenue Water Company
  - » Raymond Basin Management Board and consultants
  - » Foothill Municipal Water Company
  - » NASA and consultants



In the 1930s and during the years of World War II, the area that is now JPL was a site for testing some of the first rockets.

CERCLA Program Milestones

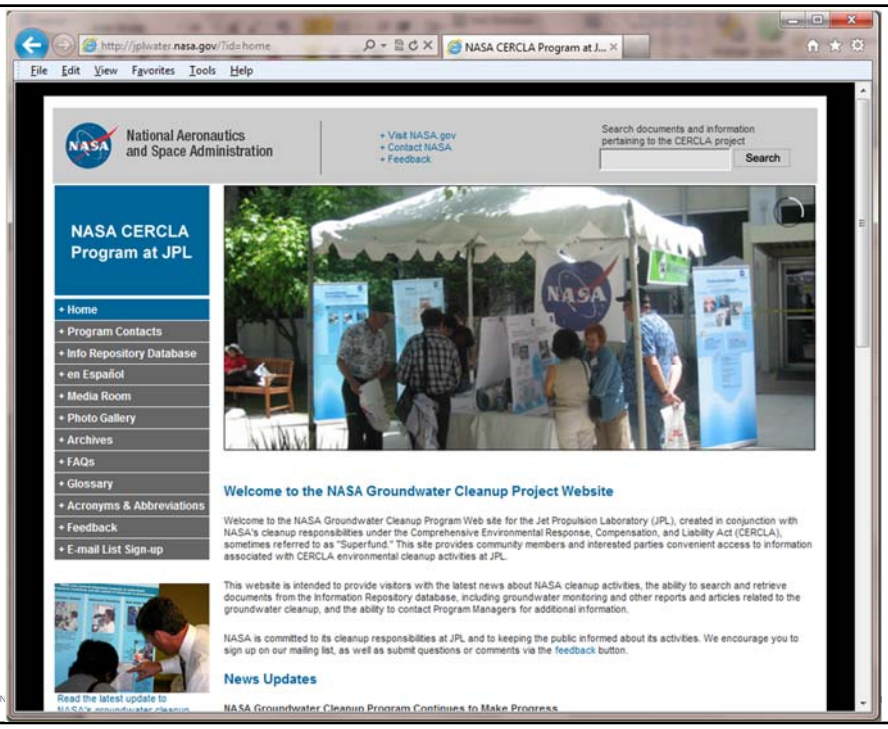
- 1936 – First rocket firings in the Arroyo Seco, at the site later to become JPL
- December1958 – NASA takes over control of JPL from the Army
- 1958 to 1963 – Seepage pits backfilled and sanitary sewer system installed
- 1980 – TCE and carbon tetrachloride detected in Pasadena's Arroyo Well
- 1990 – NASA funds water treatment plant to remove VOCs from four City of Pasadena production wells (Arroyo Well, Well 52, Ventura Well, and Windsor Well)
- October 1992 – JPL placed on the National Priorities List (NPL)
- 1992 – NASA funds water treatment plant to remove VOCs from two Lincoln Avenue Water Company (LAWC) production wells (LAWC#3 and LAWC#5)
- 1997 – Perchlorate detected in Arroyo Well (which is then shut down)
- 2002 – Pasadena shuts down Well 52, Ventura Well, Windsor Well, Sunset Well, Bangham Well, and Copelin Well due to perchlorate
- 2004 – NASA funds 2,000 gpm ion exchange system at LAWC to remove perchlorate

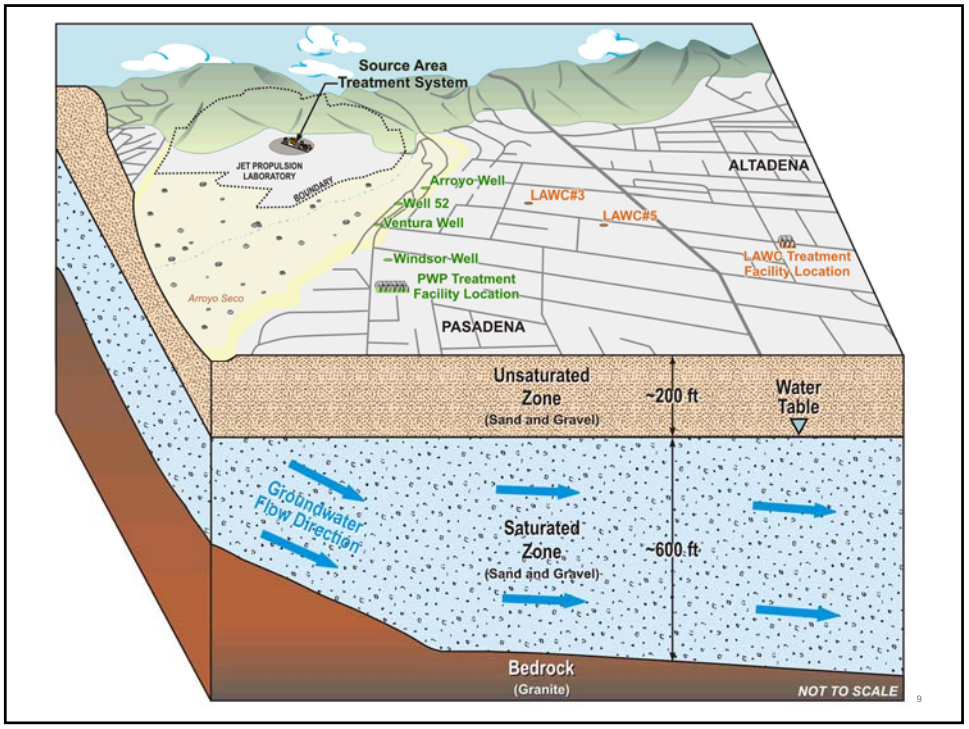
CERCLA Program Milestones (Cont.)

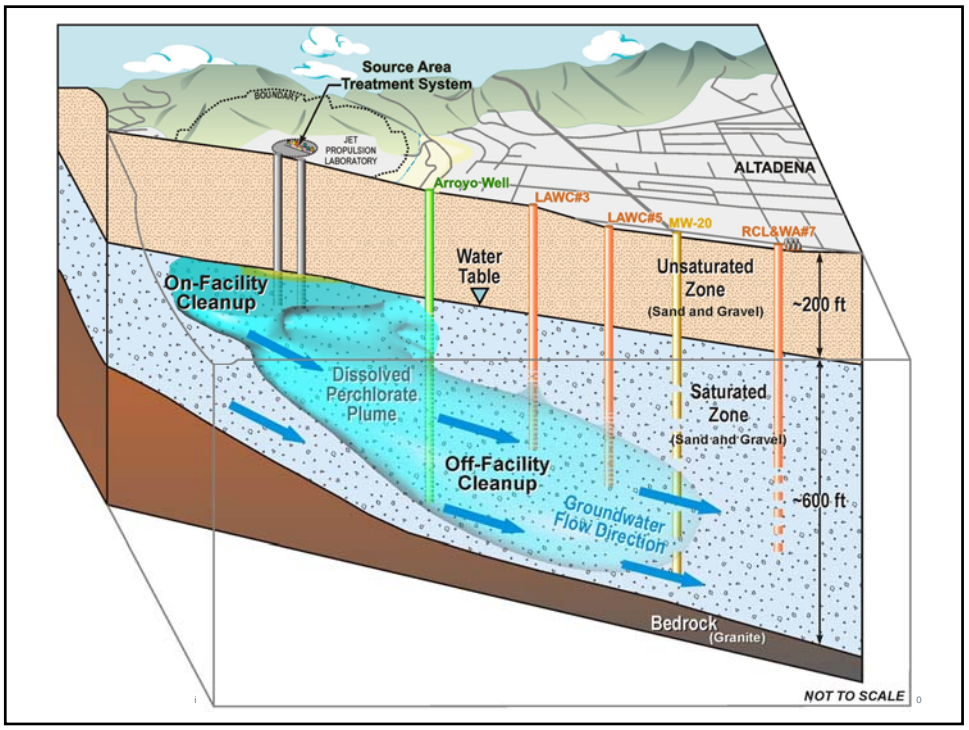
- 2005 – NASA completed construction of a source area treatment system to address the highest levels of perchlorate and VOCs within the JPL fenceline
- 2007 – NASA completed expansion of the source area treatment system
- August 2007 – Final Interim Record of Decision for OU-3 Groundwater, including the Monk Hill Treatment System (MHTS)
- July 2011 – Completed construction of the MHTS, operation begins
- February 2012 – Completed the First Five-Year Review for the JPL CERCLA Site

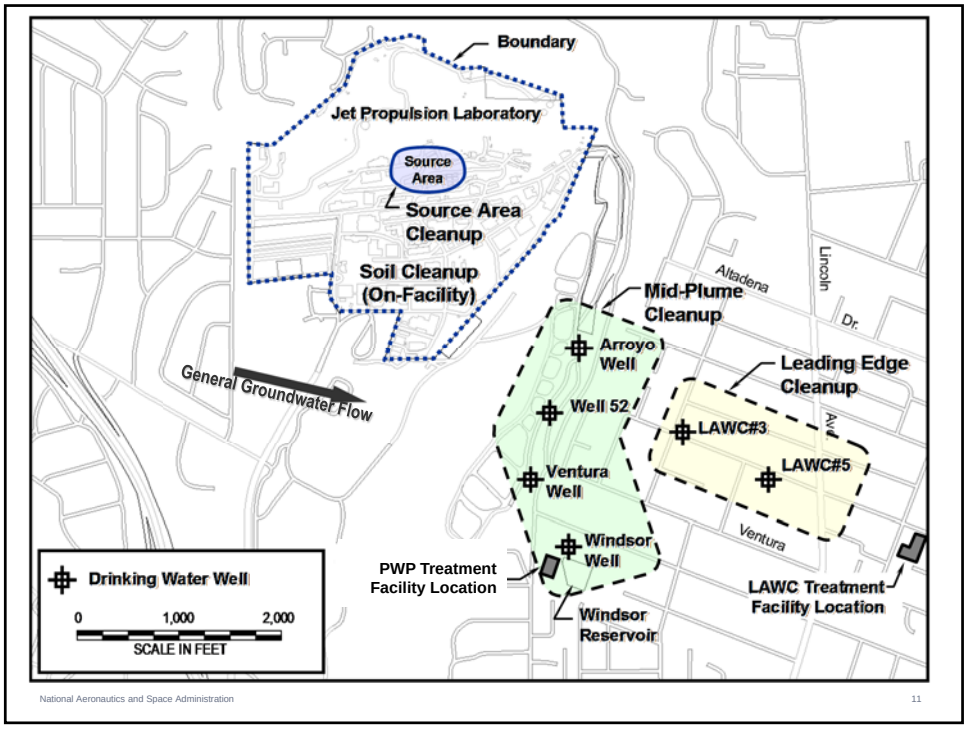
Community Outreach

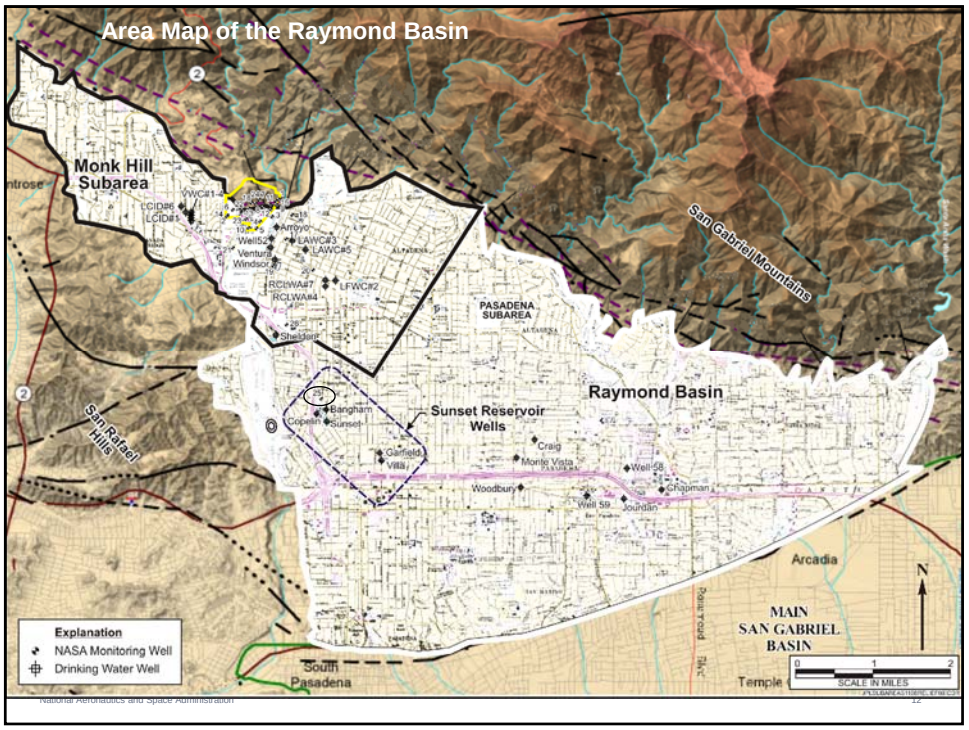
- **Merrilee Fellows** – NASA Manager for Community Involvement
- Conducted numerous public meetings and community information sessions
- Prepared numerous mailings and annual summaries that have been distributed to our mailing list. Relatively recent community outreach items:
    - » Five-Year Review Fact Sheet
    - » 2012 Year in Review
- Frequently interact with and respond to questions from the media and community members
- Updated the Community Involvement Plan in August 2006
- Update/Maintain the JPL CERCLA Program Website (http://jplwater.nasa.gov/)

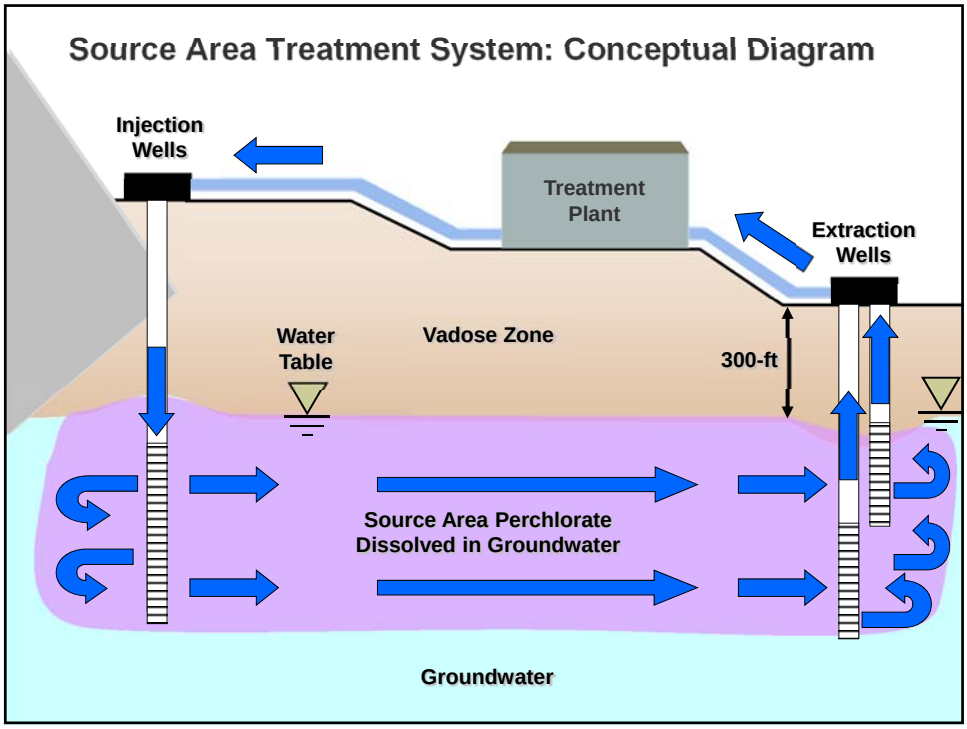



Source Area
Treatment System
JET PROPULSION LABORATORY
BOUNDARY
Arroyo Well
Well 52
Ventura Well
Windsor Well
PWP Treatment Facility Location
Arroyo Seco
ALTADENA
LAWC#3
LAWC#5
LAWC Treatment Facility Location
PASADENA
Unsaturated Zone
(Sand and Gravel)
~200 ft
Water Table
Groundwater Flow Direction
Saturated Zone
(Sand and Gravel)
~600 ft
Bedrock
(Granite)
NOT TO SCALE


Source Area
Treatment System
BOUNDARY
JET PROPULSION LABORATORY
ALTADENA
Arroyo Well
LAWC#3
LAWC#5
MW-20
RCL&WA#7
Water Table
Unsaturated Zone
(Sand and Gravel)
~200 ft
On-Facility Cleanup
Dissolved Perchlorate Plume
Saturated Zone
(Sand and Gravel)
Off-Facility Cleanup
Groundwater Flow Direction
~600 ft
Bedrock
(Granite)
NOT TO SCALE


Boundary
Jet Propulsion Laboratory
Source Area
Source Area Cleanup
Soil Cleanup (On-Facility)
General Groundwater Flow
Mid-Plume Cleanup
Arroyo Well
Well 52
Ventura Well
Windsor Well
Leading Edge Cleanup
LAWC#3
LAWC#5
Altadena
Lincoln
Dr.
Ave.
Ventura
PWP Treatment Facility Location
LAWC Treatment Facility Location
Windsor Reservoir
Drinking Water Well
0
1,000
2,000
SCALE IN FEET
National Aeronautics and Space Administration
11


Area Map of the Raymond Basin
Monk Hill Subarea
San Gabriel Mountains
PASADENA SUBAREA
Raymond Basin
Sunset Reservoir Wells
San Rafael Hills
Arcadia
MAIN SAN GABRIEL BASIN
South Pasadena
Temple
Explanation
NASA Monitoring Well
Drinking Water Well
SCALE IN MILES
National Aeronautics and Space Administration
12

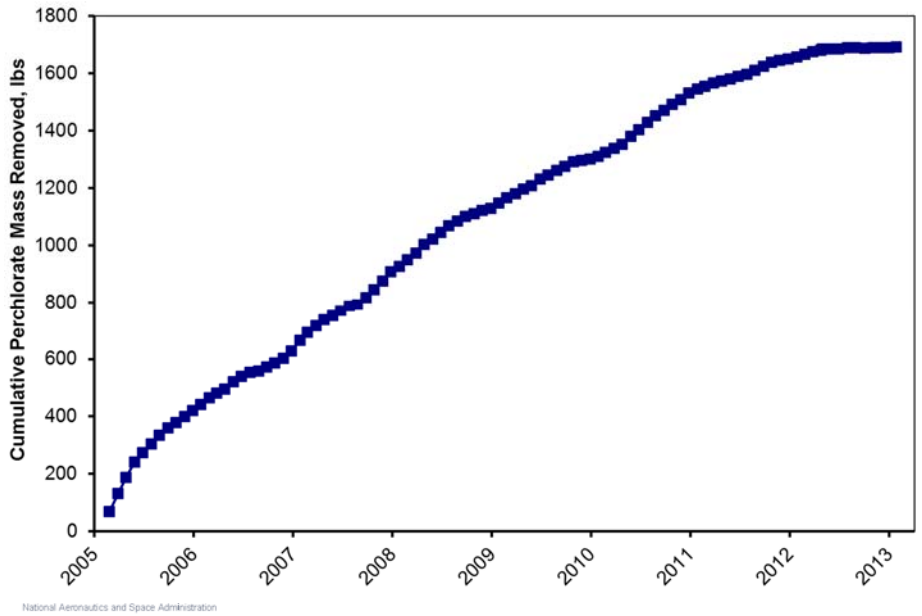

Source Area Treatment System: Conceptual Diagram
Injection Wells
Treatment Plant
Extraction Wells
Water Table
Vadose Zone
300-ft
Source Area Perchlorate Dissolved in Groundwater
Groundwater

OU-1 Operational Summary (January 2005 Through March 2013)

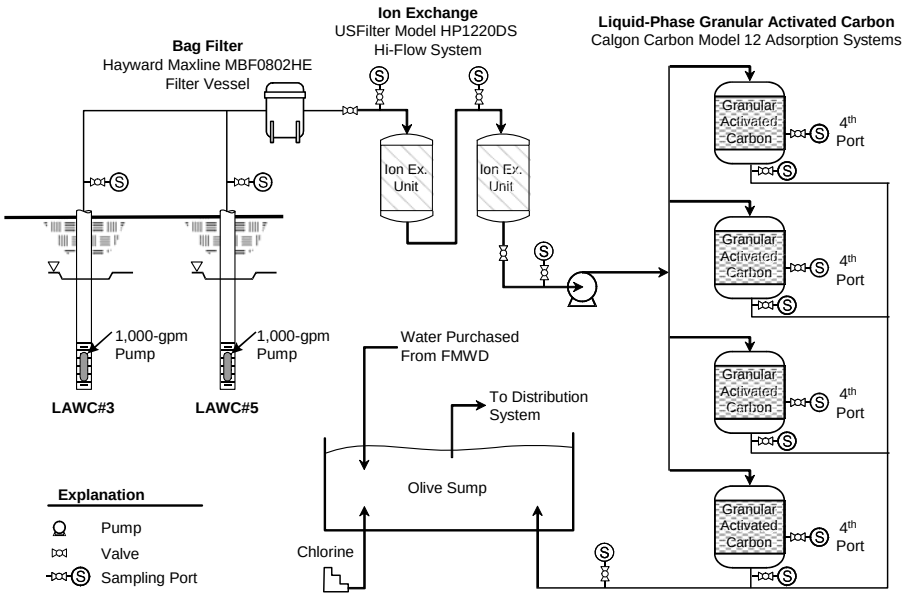
Parameter	Units	Result
Total Volume of Groundwater Extracted	ac-ft	2,698
Mass of Perchlorate Removed	lbs	1,719
Mass of CCl_4 Removed	lbs	35.1
Mass of TCE Removed	lbs	6.1

- First Quarter 2013 groundwater monitoring report to be submitted in May.
- Semi-annual OU-1 progress report to be submitted in May.

Source Area Treatment System – Perchlorate Removal



LAWC Treatment System



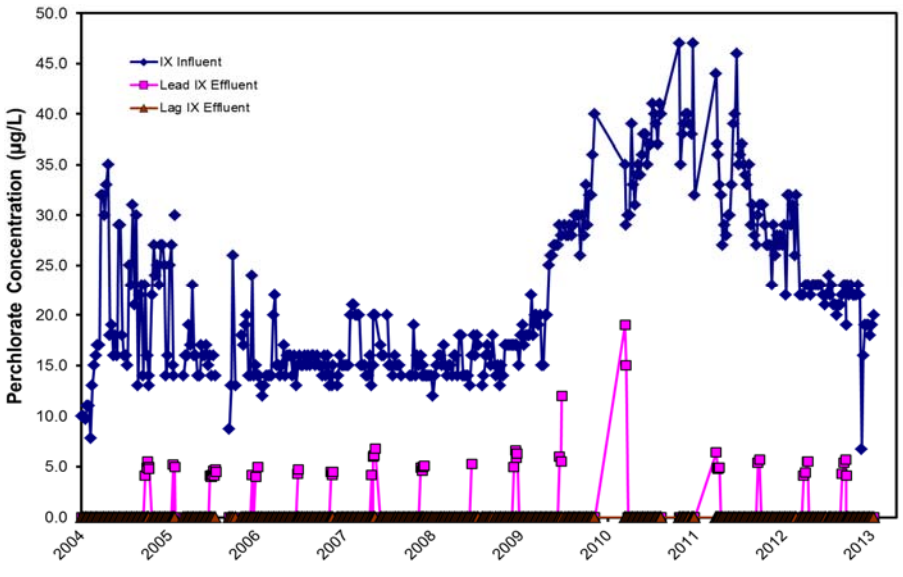
Note: The Liquid-Phase Granular Activated Carbon removes volatile organic compounds from the water.

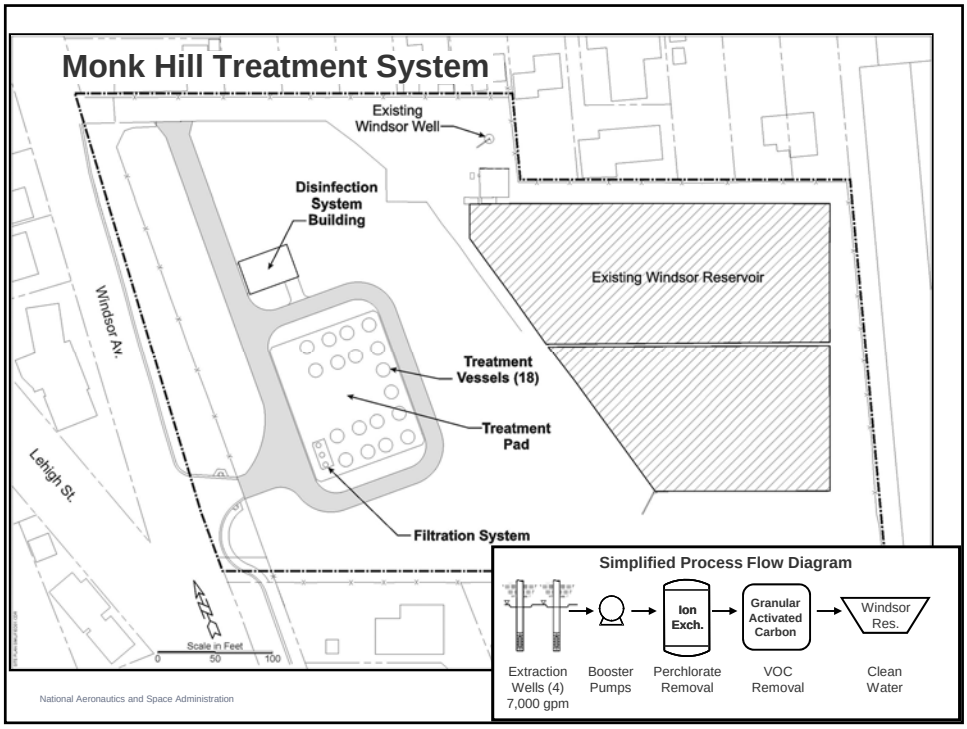
LAWC Operational Summary (July 2004 Through March 2013)

Parameter	Units	Result
Total Volume of Groundwater Extracted	ac-ft	17,130
Mass of Perchlorate Removed	lbs	896
Mass of CCl_4 Removed	lbs	79
Mass of TCE Removed	lbs	121

- NASA funds LAWC to operate system via a legal agreement
- Annual progress report to be submitted in May

LAWC Treatment System – Perchlorate Removal



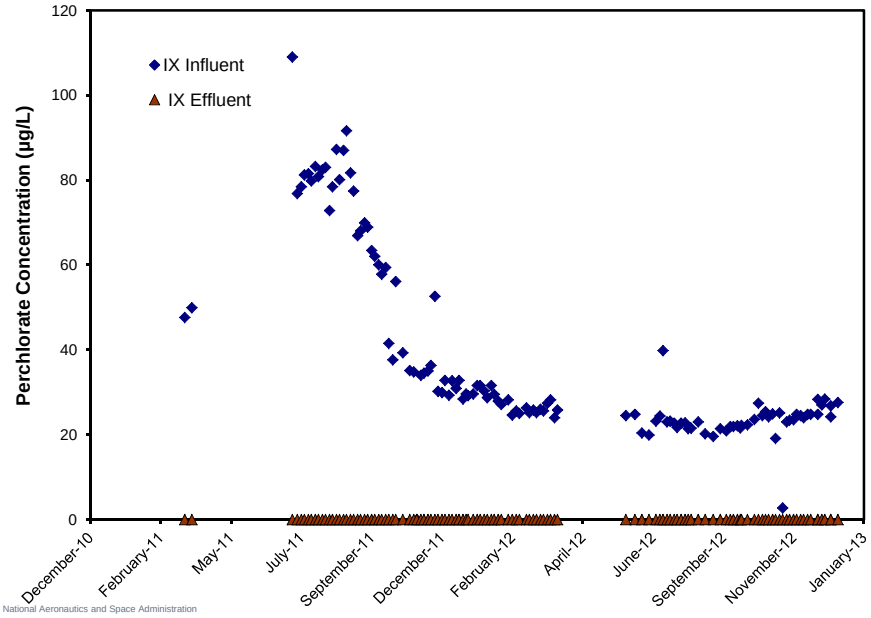

Monk Hill Treatment System
Existing Windsor Well
Disinfection System Building
Existing Windsor Reservoir
Windsor Av.
Treatment Vessels (18)
Treatment Pad
Lehigh St.
Filtration System
Scale in Feet
0
50
100
National Aeronautics and Space Administration
Simplified Process Flow Diagram
Ion Exch.
Granular Activated Carbon
Windsor Res.
Extraction Wells (4) 7,000 gpm
Booster Pumps
Perchlorate Removal
VOC Removal
Clean Water

MHTS Operational Summary (January 2011 Through March 2013)

Parameter	Units	Result
Total Volume of Groundwater Extracted	ac-ft	7,204
Mass of Perchlorate Removed	lbs	628
Mass of CCl_4 Removed	lbs	33
Mass of TCE Removed	lbs	22

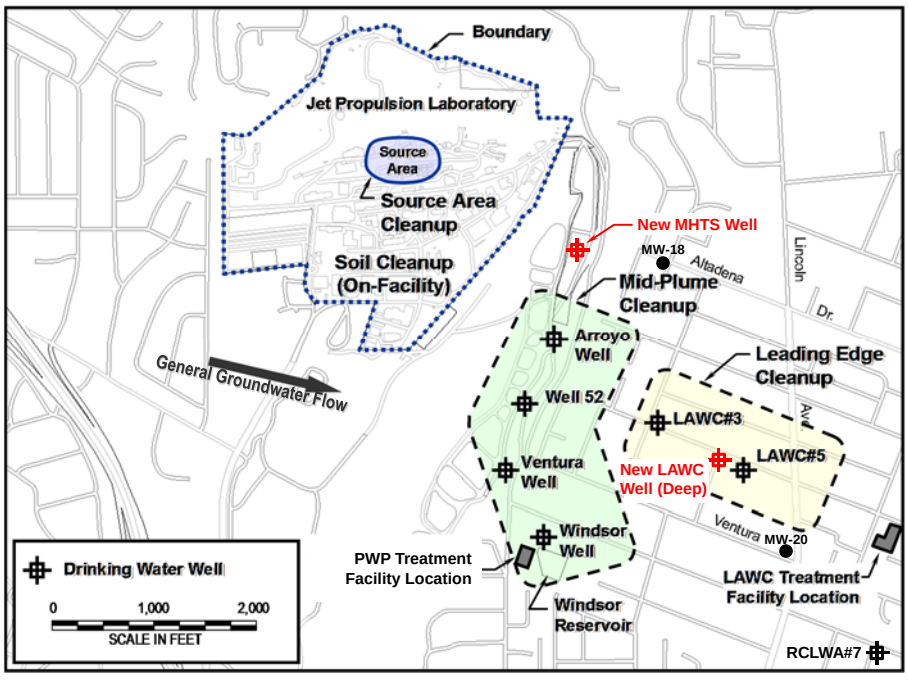
- NASA funds PWP to operate system via a legal agreement
- Annual progress report to be submitted in May

MHTS – Perchlorate Removal



Optimization Concepts

- *November 2012*: Initiated a Project to Evaluate Optimization Concepts That Would Expedite Cleanup and Improve Effectiveness
- Identified Three Potential Optimization Concepts:
  - » New LAWC Well – Enhanced Leading-Edge Containment, Operational Flexibility
  - » New MHTS Well – Enhanced Mid-Plume Capture, Operational Flexibility
  - » Wastewater Management Improvements at MHTS – Incorporate Storage Capacity of Behner Treatment Plant
- Technical Memoranda Prepared to Document Conceptual Design and Implementation Requirements – Developed in Coordination with PWP and LAWC
- Met with CDPH on March 19 to Introduce Projects
- Introduced Projects to RBMB on April 17



Sunset Reservoir Wells

- 2004 – NASA prepares a work plan to conduct an Additional Investigation associated with perchlorate in the Sunset Reservoir Wells. Plan approved by EPA and State agencies, in consultation with PWP.
- 2005 to 2006 – NASA conducts the Additional Investigation to evaluate the occurrence of perchlorate in the Sunset Reservoir Wells, including installation of two additional monitoring wells (MW-25 and MW-26), groundwater monitoring, groundwater modeling, and a state-of-the-art perchlorate isotope study (working with Dr. Neil Sturchio, University of Illinois, Chicago).
- January 2007 – NASA submitted the Additional Investigation Technical Memorandum summarizing the integrated findings from the four lines of evidence . NASA concludes that (1) the chemicals from the JPL facility are captured within the Monk Hill Subarea, and (2) the perchlorate detected at the Sunset Reservoir wells is of a different origin than that used at, and originating from, JPL.
- NASA met with PWP and separately with the RPMs to present findings, and encouraged technical discussions associated with perchlorate in the Sunset Reservoir Wells.

Sunset Reservoir Wells (Cont.)

- December 2008 – NASA responds to all comments received from EPA, DTSC, and PWP on the Additional Investigation
- October 2009 – Pasadena contractor, Geoscience submits, a technical report.
- January 2010 – NASA responds to the Geoscience technical report, providing comments and recommendations.
- February 2010 – During a teleconference on technical aspects of modeling results, NASA, PWP, and EPA conclude that Geoscience did not provide sufficient analysis in their groundwater modeling results to substantiate their interpretations. PWP and Geoscience initially agreed to re-run their model with appropriate particle release locations. PWP ultimately decided not to pursue this additional analysis, citing the expense.
- NASA provided all the JPL Groundwater Model source files to PWP and Geoscience, and offered to run the additional modeling analysis for PWP using the Geoscience Model if their source files were provided.

Sunset Reservoir Wells (Cont.)

- NASA decides to submit AI findings to outside peer review for publication.
- March 2010 – NASA's Additional Investigation published in *Environmental Forensics Journal* (peer-reviewed).
- 2011-2012 – NASA responds to all requests from PWP for data related to the Additional Investigation.
- May 2012 and August 2012 – PWP submits additional technical memoranda to EPA prepared by a PWP staff member, David Kimbrough, Ph.D.
- NASA thoroughly evaluates findings and has Dr. Neil Sturchio re-evaluate the perchlorate and geochemical data considering PWP's technical memoranda. Dr. Sturchio concludes, "The opinions of PWP are found to be based on flawed assumptions and incogent arguments leading to erroneous and unfounded conclusions regarding the origin of perchlorate in the Sunset Reservoir wells."
- September 2012 – NASA thoroughly evaluated and provided a technical response to the PWP memoranda. NASA again concludes based on all available data/evidence that (1) the chemicals from the JPL facility are captured within the Monk Hill Subarea, and, (2) the perchlorate detected at the Sunset Reservoir wells is of a different origin than that used at, and originating from, JPL.

Path Forward

- Recommend Concurrently Moving Forward with the Following:
  - » Optimization Work Plan for the Three Optimization Projects
  - » Focused Feasibility Study (First Step in Moving Toward a Final Groundwater Remedy)
- Final Groundwater Remedy:
  - » Combine the Two Existing Interim Remedies/RODs for OU-1 and OU-3 into a Single Final Groundwater Remedy
  - » Will Require a Focused Feasibility Study, Proposed Plan and Record of Decision (by June 2015)
  - » Continue Monitoring Groundwater, Including MW-25 and MW-26
  - » Evaluate All Available Data at the Next Five-Year Review (2017)
- Planning to Submit the Focused Feasibility Study in May

Attachment No. 3

David Kimbrough's Presentation Slides

PASADENA

Pasadena Water and Power

Sunset Reservoir Wells Investigation

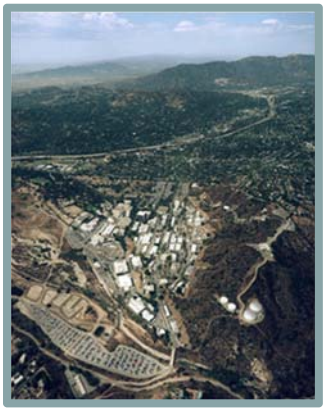
Presented by
David Kimbrough, Ph.D., Water Quality Manager

Presented to
United States Environmental Protection Agency
at the Jet Propulsion Laboratories, Pasadena

April 30, 2013

Jet Propulsion Laboratory

Pasadena Water and Power



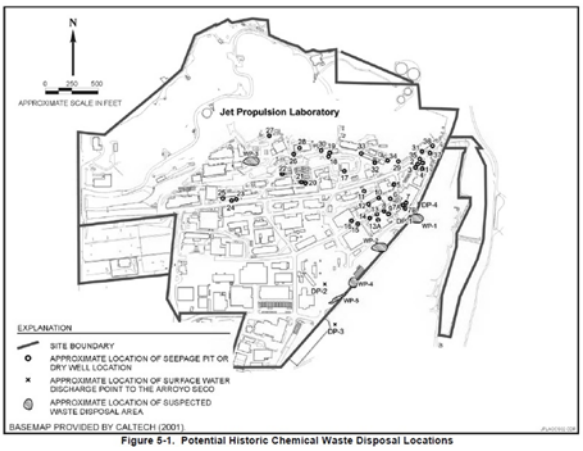
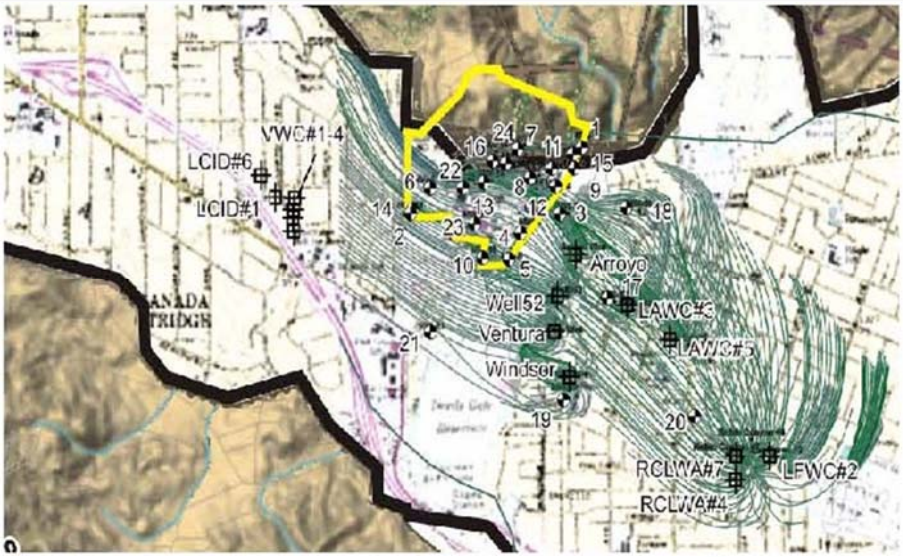


Figure 5-1. Potential Historic Chemical Waste Disposal Locations

PASADENA

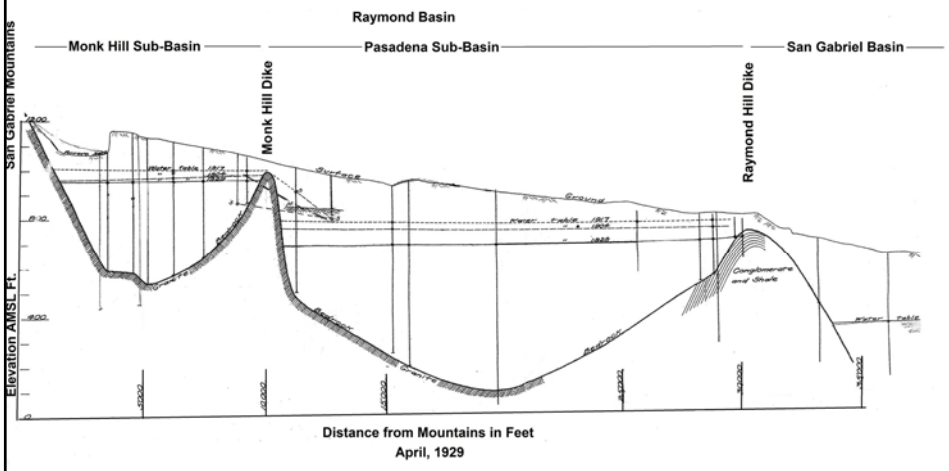
JPL and the Monk Hill Sub-Basin

Pasadena Water and Power



Raymond Basin

Pasadena Water and Power



Today's Question

Pasadena Water and Power

- Is Water Flowing from JPL which Contains VOCs and Perchlorate Confined in the Monk Hill Sub-Basin?
- Or has this Water Moved into the Pasadena Sub-Basin and is Contaminating the Sunset Reservoir Wells?
- Was there Containment Between 1940 and Today?

PASADENA

5

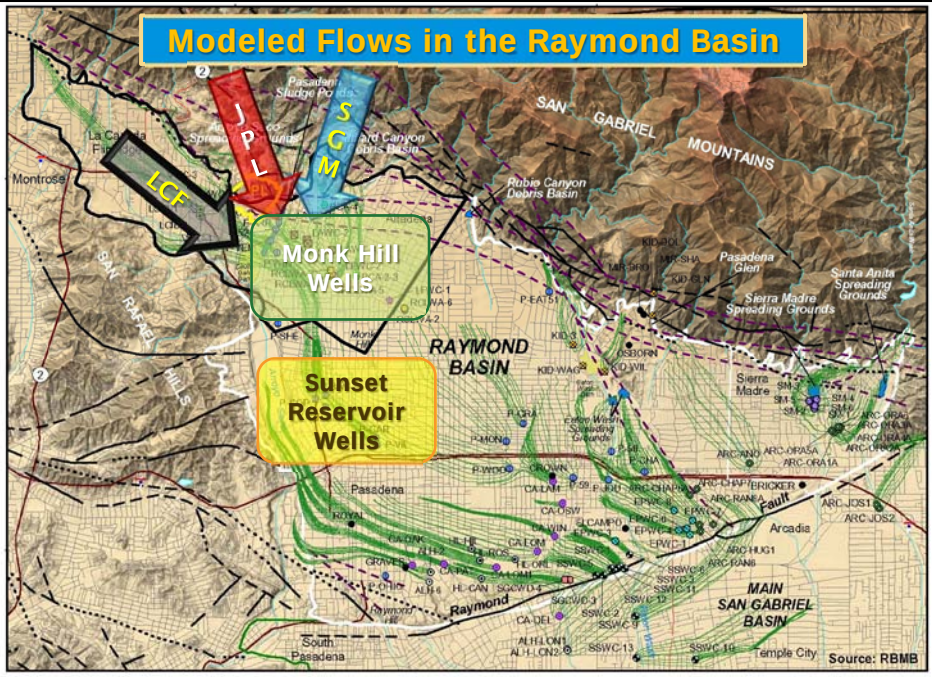


Figure 2. Particle tracking simulations using the independently-developed RBMB Model indicate that capture zones of the Sunset Reservoir Wells are south of the JPL Facility.

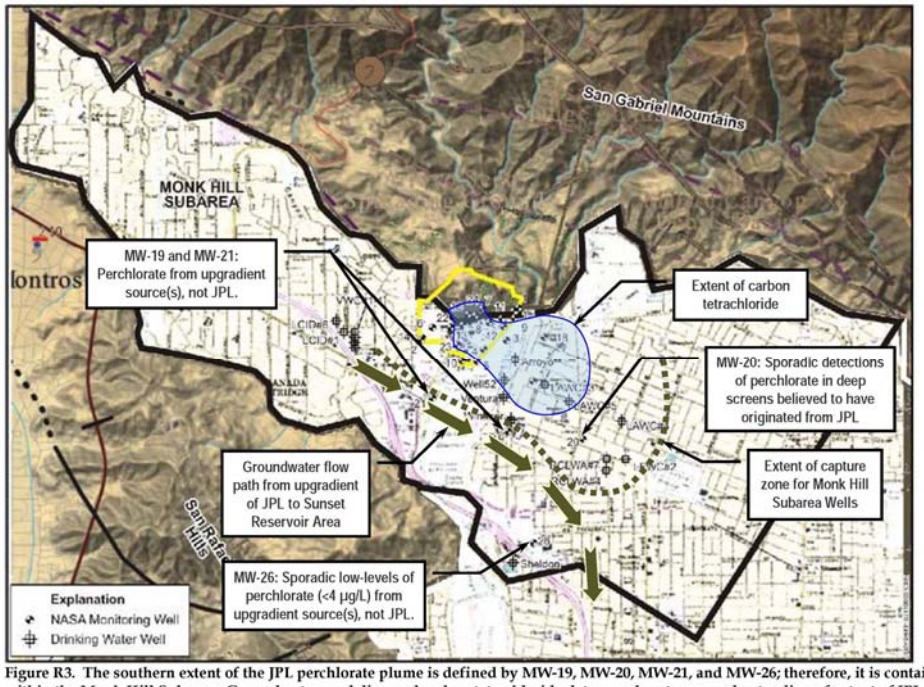


Figure R3. The southern extent of the JPL perchlorate plume is defined by MW-19, MW-20, MW-21, and MW-26; therefore, it is contained within the Monk Hill Subarea. Groundwater modeling and carbon tetrachloride data corroborate our understanding of extent of JPL perchlorate.

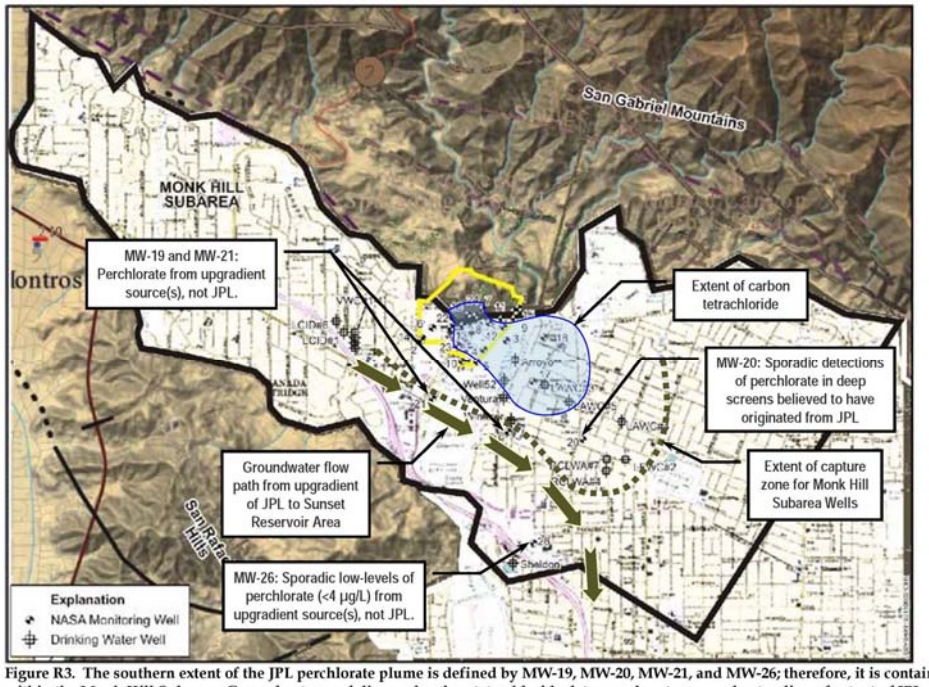
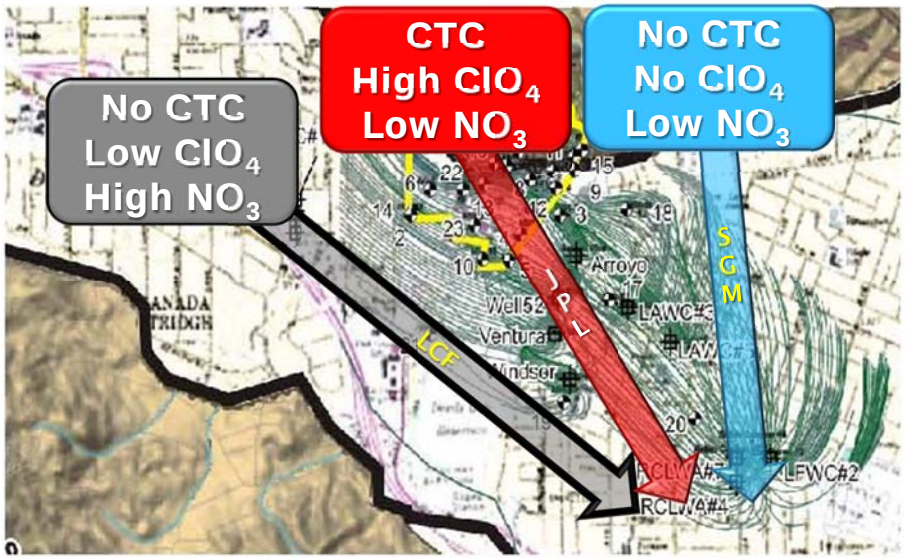


Figure R3. The southern extent of the JPL perchlorate plume is defined by MW-19, MW-20, MW-21, and MW-26; therefore, it is contained within the Monk Hill Subarea. Groundwater modeling and carbon tetrachloride data corroborate our understanding of extent of JPL perchlorate.

Testing the Two Hypotheses



Testing Containment

Pasadena Water and Power

- If the Containment Hypothesis is Correct, the Water in the Sunset Reservoir Wells Should Resemble the Water in the La Cañada – Flintridge area.
- If the Non-Containment Hypothesis is Correct, then the Water in the Sunset Reservoir Wells Should be a Blend of water from the La Cañada – Flintridge area, the San Gabriel Mountains, and JPL

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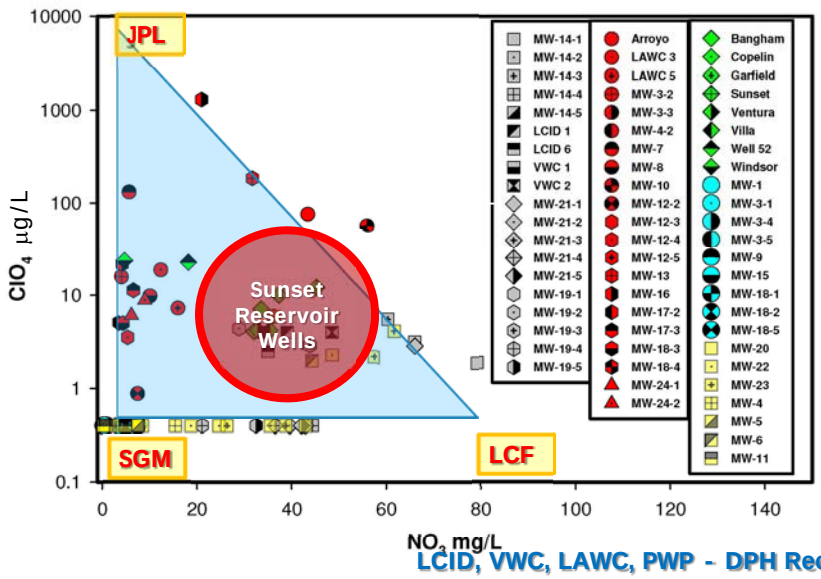
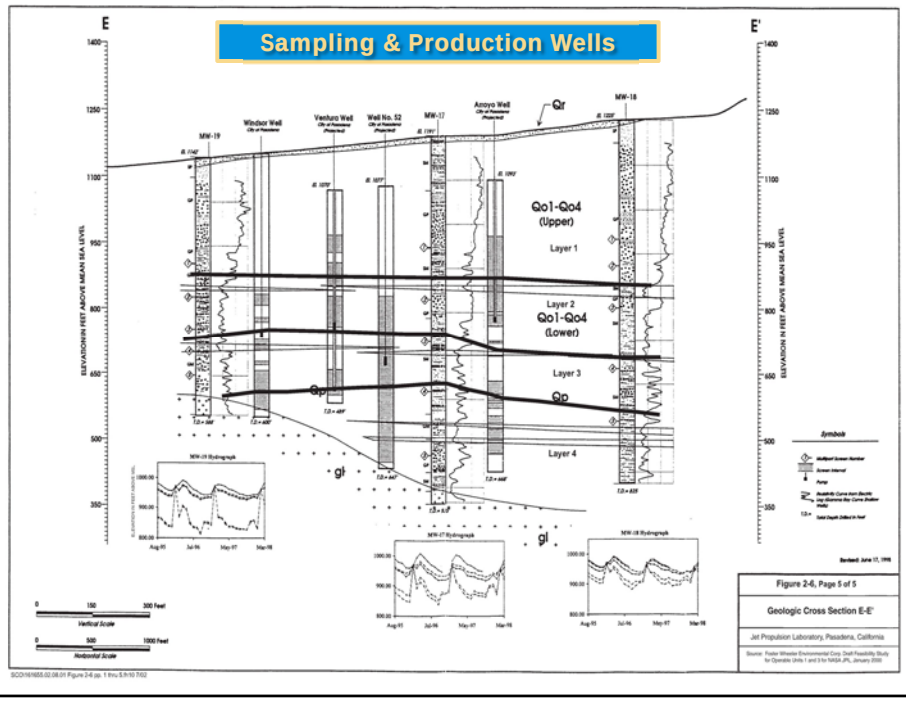
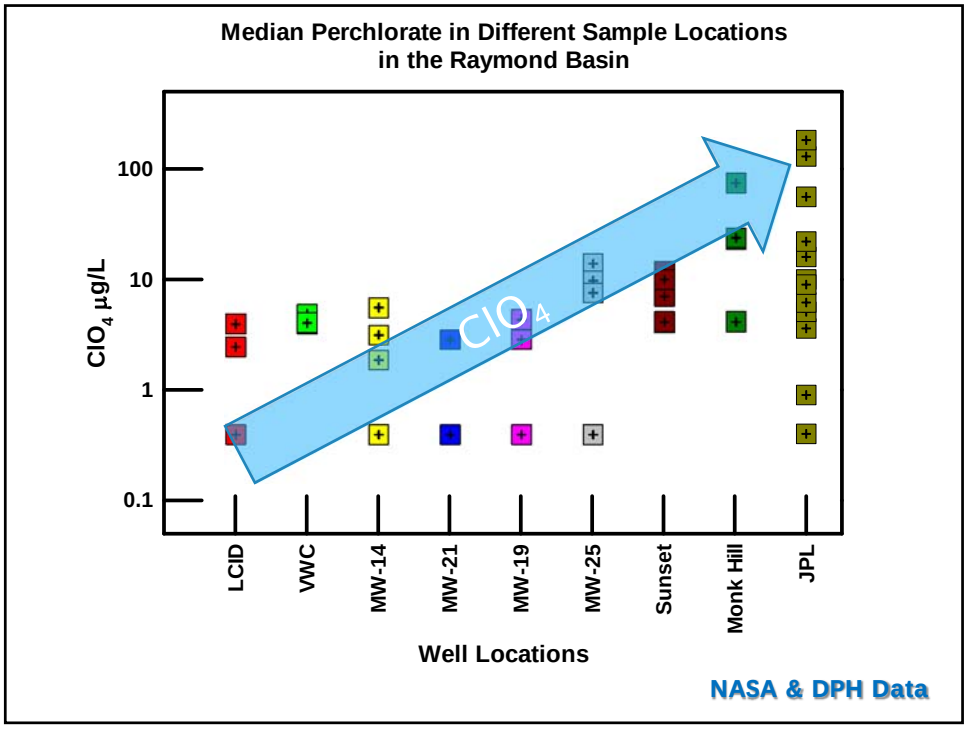
Median Concentrations of ClO_4 and NO_3 from Raymond Basin Wells 1985 - 2011

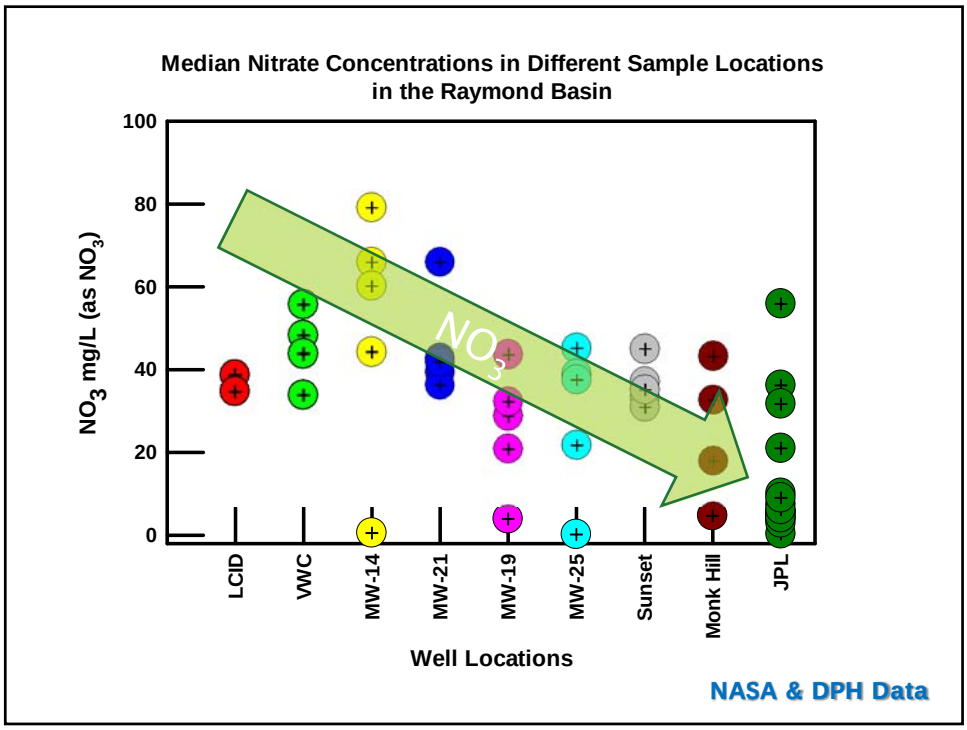


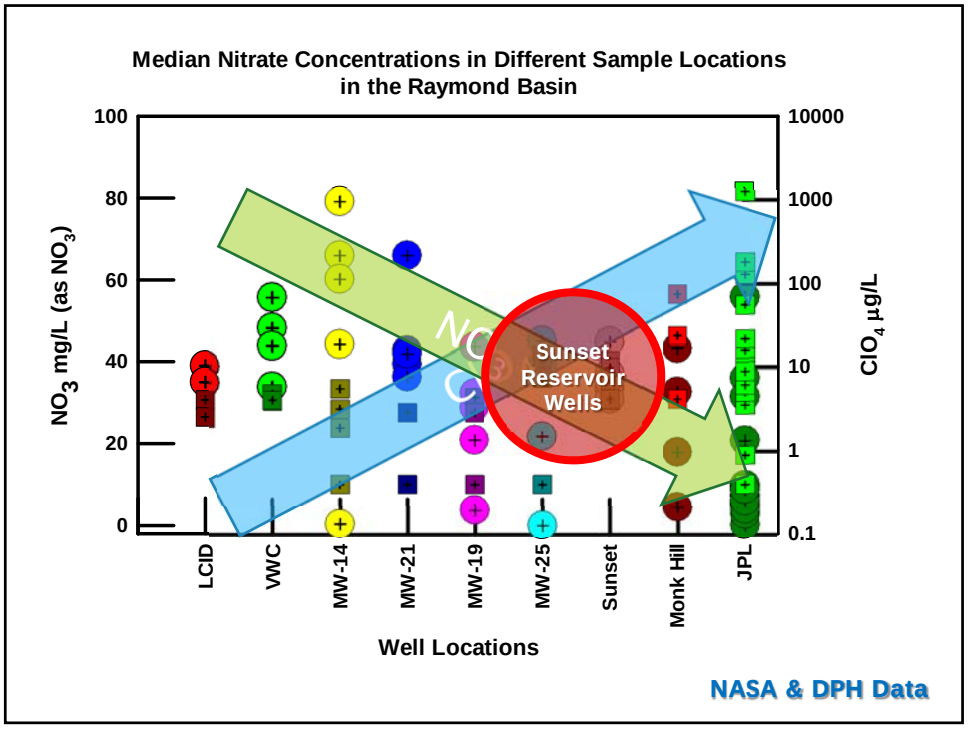
LCID, VWC, LAWC, PWP - DPH Records
NASA Records

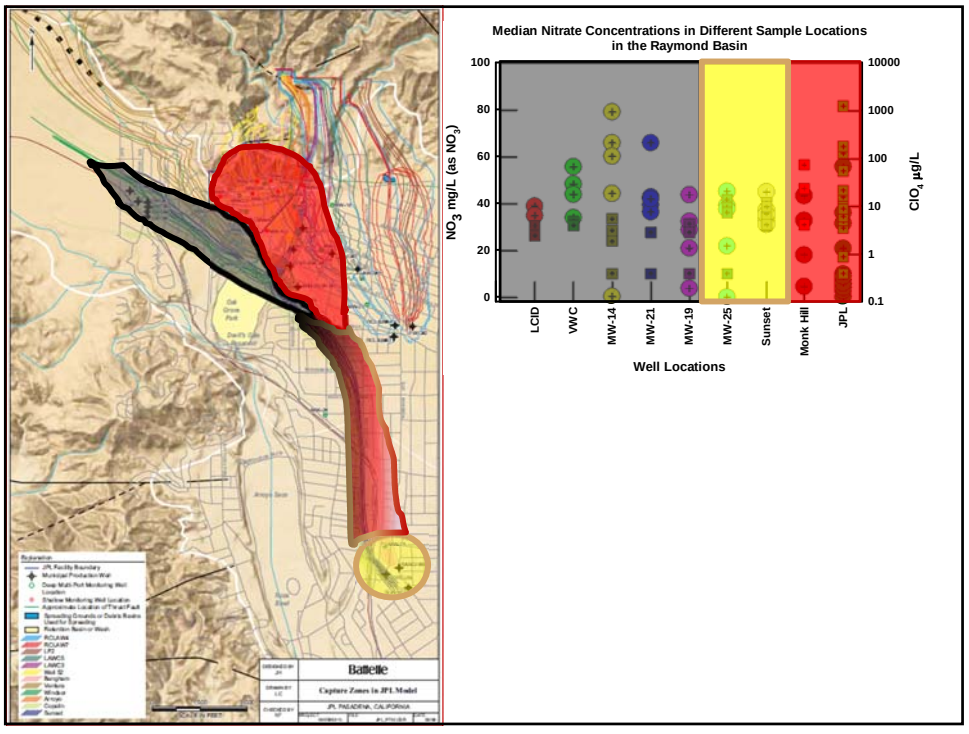
Sampling & Production Wells

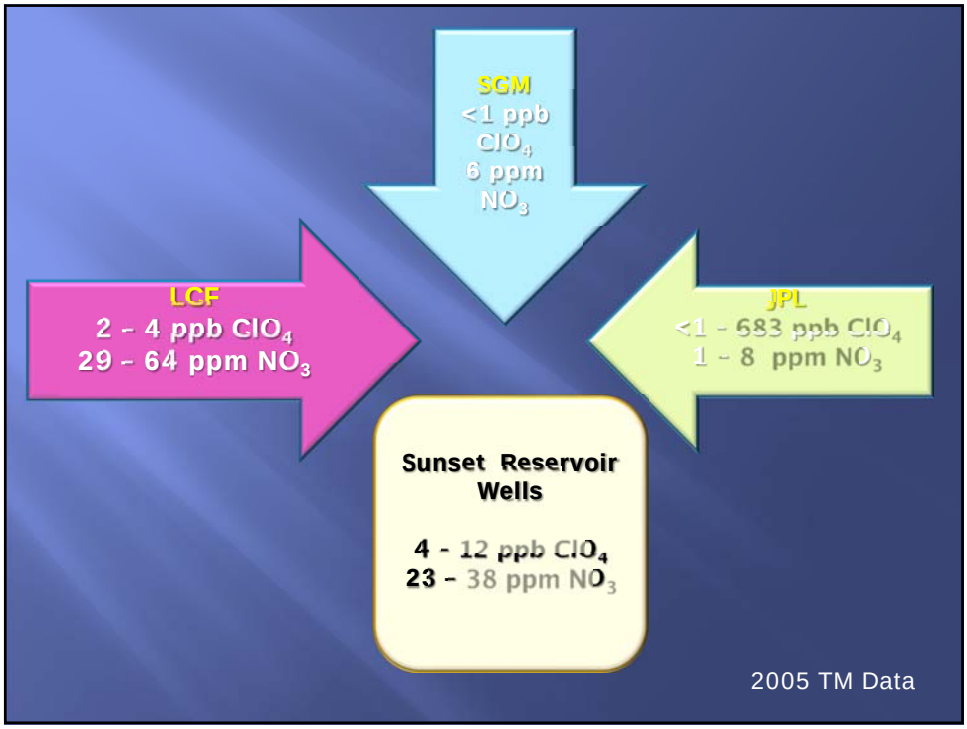



Median Perchlorate in Different Sample Locations
in the Raymond Basin
ClO_4 µg/L
100
10
1
0.1
ClO_4
LCID
VWC
MW-14
MW-21
MW-19
MW-25
Sunset
Monk Hill
JPL
Well Locations
NASA & DPH Data


Median Nitrate Concentrations in Different Sample Locations
in the Raymond Basin
NO_3 mg/L (as NO_3)
100
80
60
40
20
0
NO_3
LCID
VWC
MW-14
MW-21
MW-19
MW-25
Sunset
Monk Hill
JPL
Well Locations
NASA & DPH Data


Median Nitrate Concentrations in Different Sample Locations in the Raymond Basin
100
80
60
40
20
0
NO_3 mg/L (as NO_3)
10000
1000
100
10
1
0.1
ClO_4 µg/L
Sunset Reservoir Wells
LCID
VWC
MW-14
MW-21
MW-19
MW-25
Sunset
Monk Hill
JPL
Well Locations
NASA & DPH Data


Battelle
Capture Zones in JPL Model
JPL PASADENA, CALIFORNIA
Median Nitrate Concentrations in Different Sample Locations in the Raymond Basin
100
80
60
40
20
0
NO_3 mg/L (as NO_3)
10000
1000
100
10
1
0.1
ClO_4 µg/L
LCID
VWC
MW-14
MW-21
MW-19
MW-25
Sunset
Monk Hill
JPL
Well Locations



Conclusions

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The Only Reasonable Explanation of this data is that the Water in Sunset Reservoir Wells is a Blend of Water from LCF, JPL, and the SGMs.

There was no Containment

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Pasadena Water and Power

Sunset Reservoir Wells Investigation
Chlorate (ClO_3)

Presented by
David Kimbrough, Ph.D., Water Quality Manager

Presented to
United States Environmental Protection Agency
April 30, 2013

Chlorate (ClO_4)

Pasadena Water and Power

- Samples are Routinely Collected for Chlorate at MHTS and the Upgradient Monitoring Wells.
- Additional Samples were Collected from other Sites
  - Valley Water Co.
  - Sunset Reservoir Wells
  - Eastside Wells

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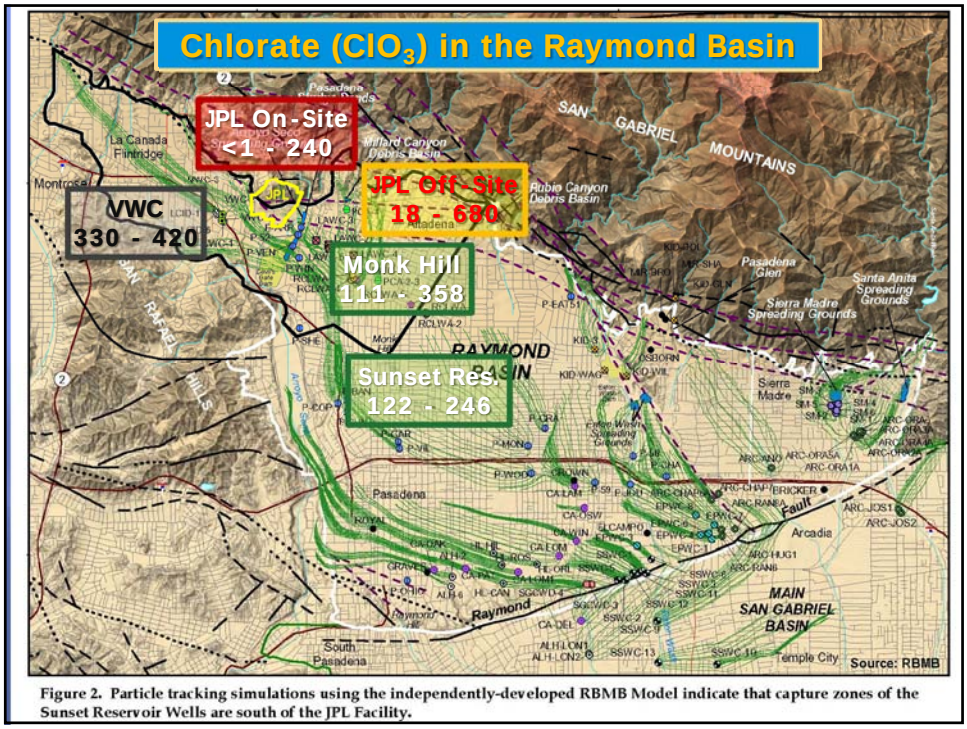
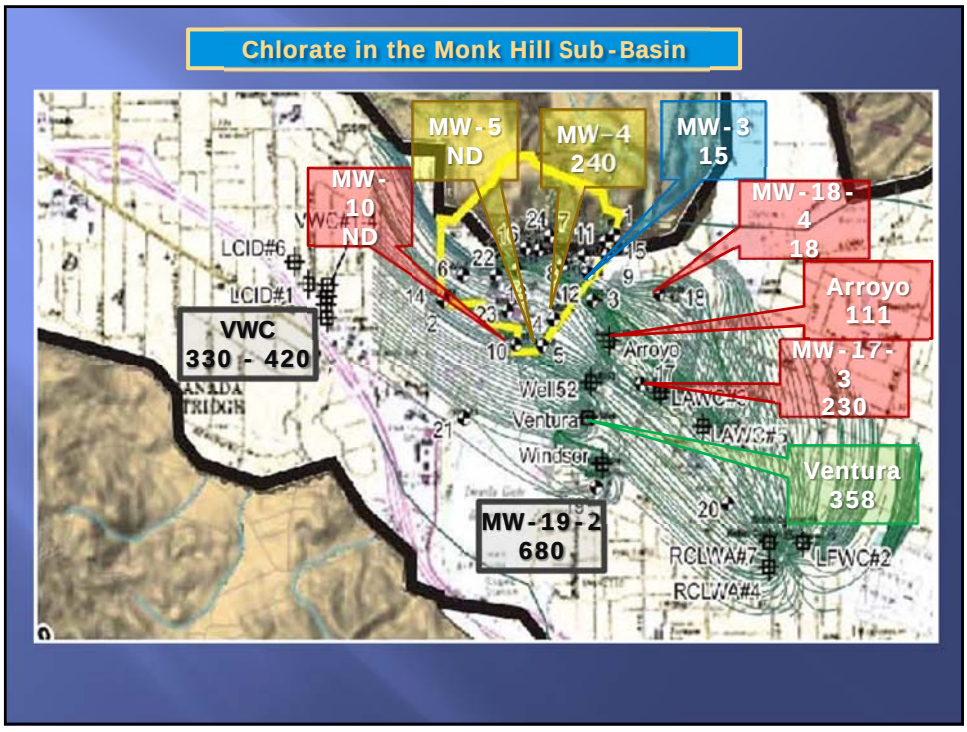


Figure 2. Particle tracking simulations using the independently-developed RBMB Model indicate that capture zones of the Sunset Reservoir Wells are south of the JPL Facility.



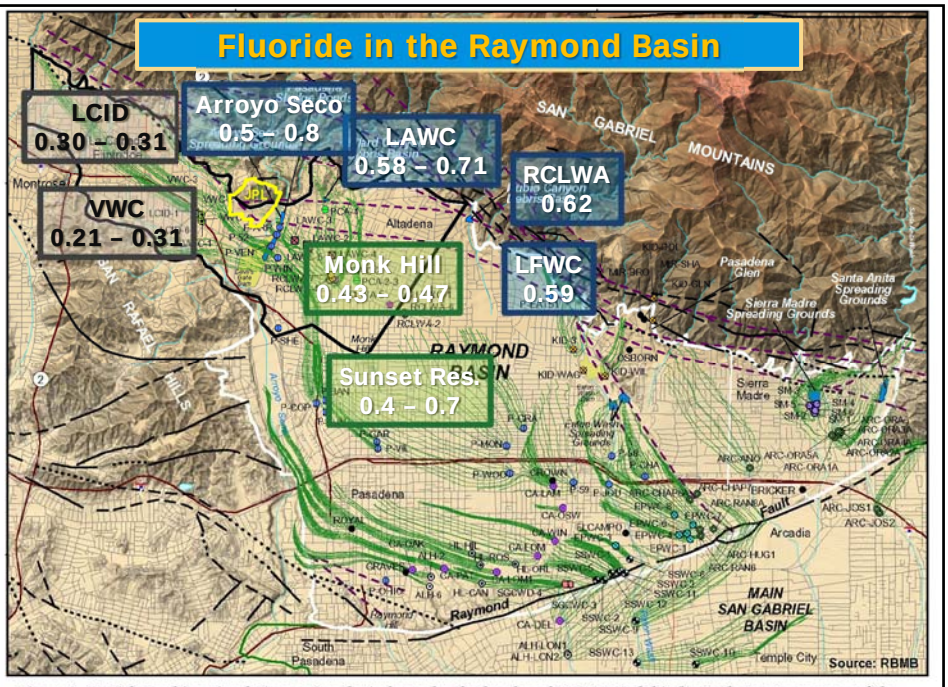


Figure 2. Particle tracking simulations using the independently-developed RBMB Model indicate that capture zones of the Sunset Reservoir Wells are south of the JPL Facility.

Conclusions

Pasadena Water and Power

- Samples from the La Cañada – Flintridge area have Chlorate Concentrations much Higher than in the Sunset Reservoir Wells but Lower Concentrations of Fluoride
- Samples from JPL have Much Lower Concentrations of Chlorate than the Sunset Reservoir Wells.
- Samples from the Monk Hill Sub-Basin have Higher Concentrations of Fluoride than the LCF area.
- The Amount of Chlorate and Fluoride found in Sunset Reservoir Wells Indicates that the Majority of Water Comes from JPL

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